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Field Service Procedure

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D-TEC Desflurane Vaporizer Installation on Machines With Removable Vaporizer Mounting Systems

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D-TEC Desflurane Vaporizer Installation on Machines with Removable Vaporizer Mounting Systems

Installation Procedure

NOTE: This procedure only applies to installation of D-Tec Desflurane vaporizer on Narkomed 6000, Narkomed M, Narkomed GS Euro, Julian, Fabius GS and Fabius machines with removable vaporizer mounting systems. Refer to Field Service Procedure SP00091 for other desflurane vaporizer installations.

⚠WARNING: Do not install a D-Tec vaporizer in the right hand position of a Narkomed 6000 as this will result in an incorrect fit and may cause leaks in the fresh gas delivery system.

⚠WARNING: Do not install a D-Tec vaporizer on a Narkomed Mobile without the correct vaporizer support block as this will result in an incorrect fit and may cause leaks in the fresh gas delivery system. Refer to this procedure to verify correct vaporizer support block prior to D-Tec vaporizer mounting.

⚠WARNING: The O-rings supplied with this vaporizer are incompatible for use on the Narkomed 6000, Narkomed GS Euro, Narkomed M, Fabius GS or the USA manufactured Fabius. These systems shall only use O-RING #113 (NITRILE) P/N 4115864.

NOTE:Proceed to Section 2.0 if you are not removing an existing vaporizer.

1.0 Vaporizer Draining, Drying and Removal Procedure:

⚠WARNING: Do Not install a D-Tec vaporizer in the right hand position of a Narkomed 6000 as this will result in an incorrect fit and may cause leaks in the fresh gas delivery system.

Before removing an existing vaporizer from the machine perform a fresh gas leak test at the fresh gas outlet to verify the initial gas circuit integrity. Refer to the device service manual for specific instructions.

If there is an existing vaporizer in place, it must be drained and dried as follows:

⚠Caution: The steps in this section must be performed in the following sequence:

1.1 Activate the waste gas scavenger.

1.2 Attach a breathing bag to the bag mount port.

1.3 Open the APL valve to the minimum position.

1.4 Connect the inspiratory and expiratory valves using a 22 mm hose.

1.5 Ensure the fresh gas hose is connected between the absorber system and the machine.

1.6 Turn the System Power switch to ON.

Installation Procedure (continued)

1.7 Set the ventilation control to Manual or MAN/Spont mode.

1.8 Set all vaporizer handwheels to their "0" position.

⚠WARNING: Do Not inhale anesthetic vapors as this could result in personal injury.

1.9 Open the filler and drain plugs and drain the vaporizer into a suitable container. Dispose of the residual agent in an approved manner.

1.10 Close the filler and drain plugs.

1.11 Move the exclusion lever away from the vaporizer being removed. Depress the Zero release button and rotate the vaporizer handwheel to the maximum concentration setting.

1.12 Set the oxygen flow to 10 L/min. for at least 20 minutes.

1.13 Turn the vaporizer handwheel to the Zero position, set the oxygen flow to minimum, and turn the System Power switch to STANDBY.

1.14 Locate the vaporizer lock down lever at the rear of the vaporizer, and turn the lever 90° counter-clockwise.

NOTE: Earlier units are not configured as "User Removable" and therefore require a special wrench (P/N 4114522) to be inserted into the keyed spline which is covered by a "DO NOT REMOVE" label. Remove this label for access to the keyed spline through the rocker plate at the rear of the vaporizer, and turn the tool 90° counter-clockwise. See Figure 1.

1.15 Verify that the exclusion slider bar is disengaged from the vaporizer being removed.

1.16 Hold the vaporizer with two hands and lift it up until it clears the mounting block, then bring it forward to clear the machine.

2.0 Machine Preparation:

2.1 Before installing a vaporizer, perform a fresh gas leak test at the fresh gas outlet to verify gas circuit integrity. Refer to the device service manual for specific instructions.

2.2 Examine the vapor mount O-rings and replace them if needed.

⚠WARNING: The O-rings supplied with this vaporizer are incompatible for use on the Narkomed 6000, Narkomed GS Euro, Narkomed M, Fabius GS or the USA manufactured Fabius. These systems shall use only O-ring #113 (NITRILE) P/N 4115864.

Note: The following two steps apply to the Narkomed Mobile and Fabius machines.

2.3 Verify the correct vaporizer support block is installed on the vaporizer mount. See Figure 2.

Installation Procedure (continued)

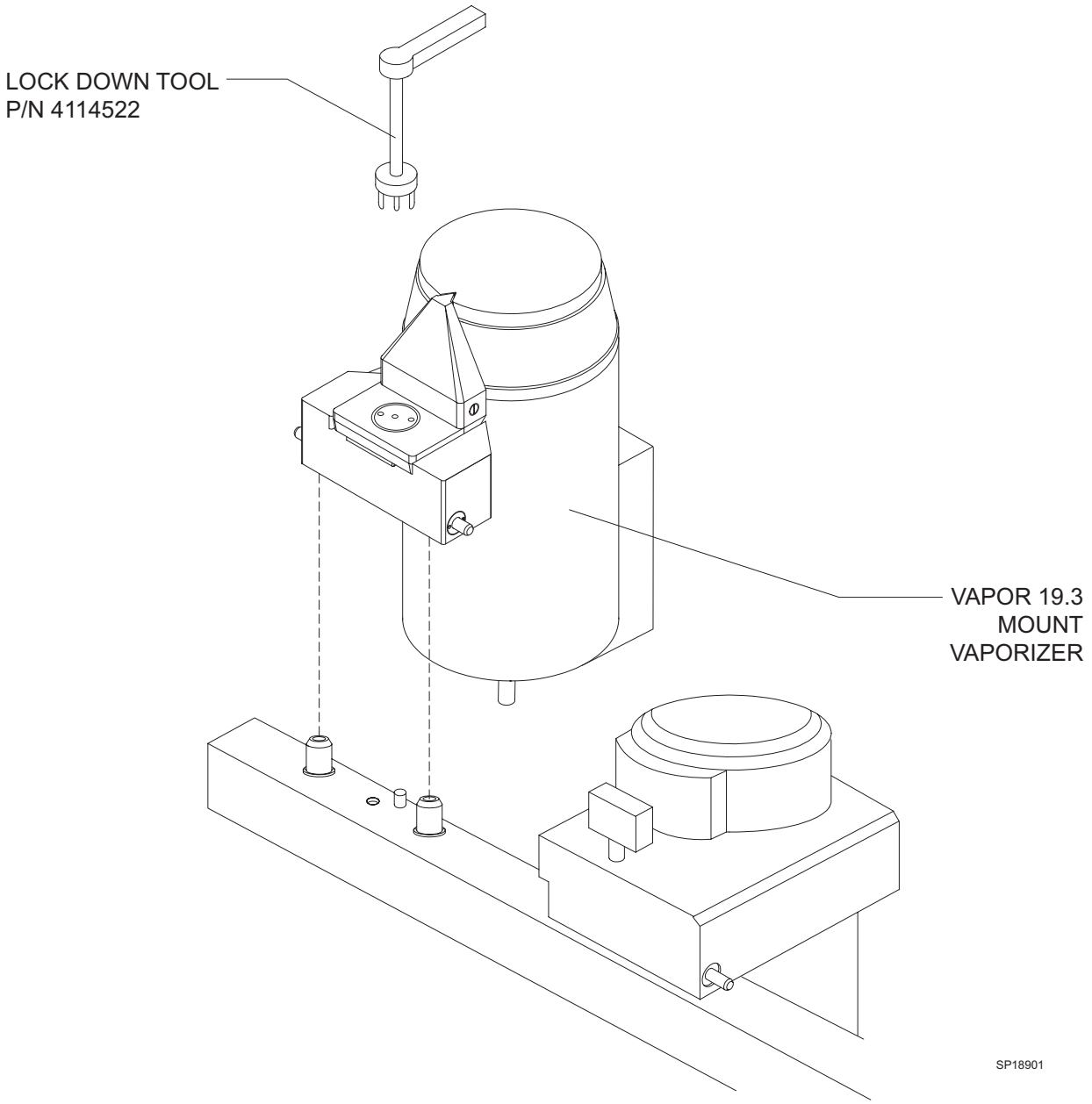

FIGURE 1. Vapor 19.3 Vaporizer Installation

Installation Procedure (continued)

⚠WARNING: Do not install a D-Tec vaporizer on a Narkomed Mobile or Fabius without the correct vaporizer support block as this will result in an incorrect fit and may cause leaks in the fresh gas delivery system. Refer to this procedure to verify correct vaporizer support block prior to D-Tec vaporizer mounting.

2.4 If applicable, remove the original vaporizer support block and install the appropriate vaporizer support block using the original hardware as shown in Figure 2.

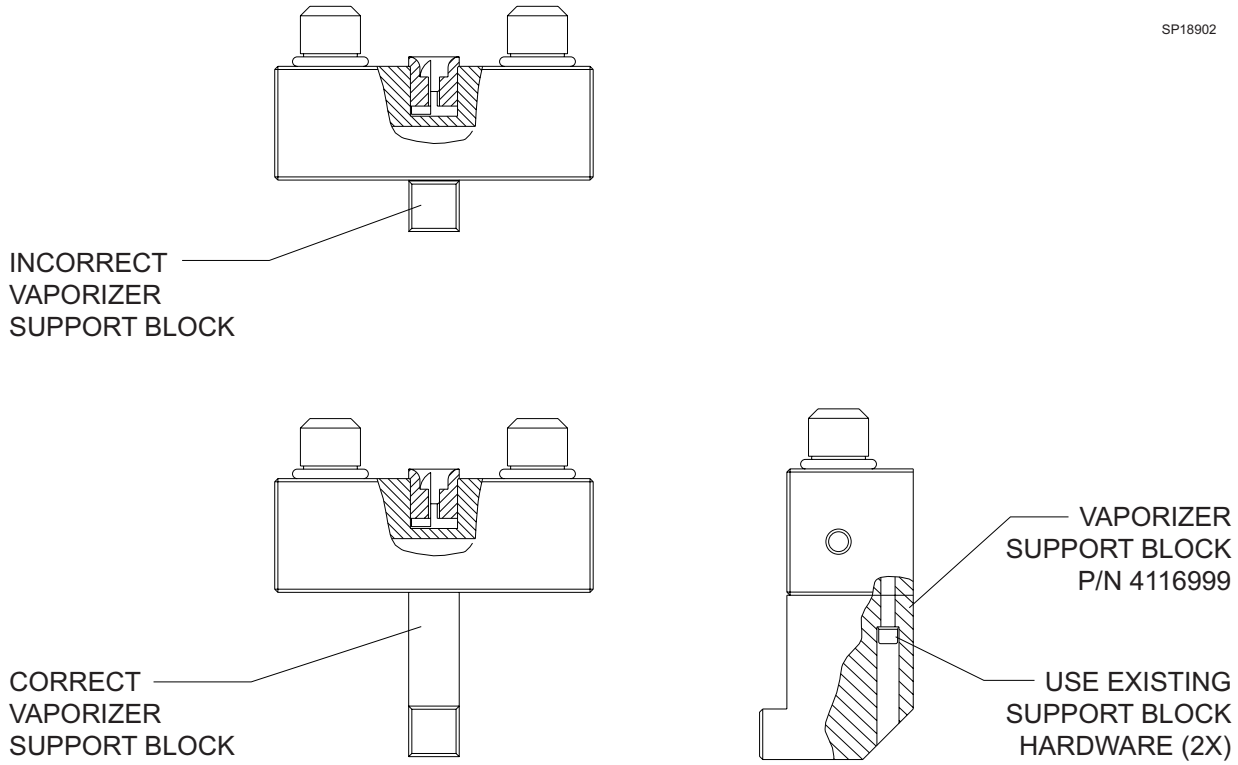

FIGURE 2. Vaporizer Support Block (NM Mobile and Fabius only)

Installation Procedure (continued)

3.0 Vaporizer Preparation Procedure:

⚠Caution: Use only a Duracell 1604, or VARTA Energy 2000 9-volt battery in this vaporizer. If any other battery is installed, it may damage the vaporizer.

⚠WARNING: The battery terminals must be firmly clipped onto the battery to help prevent a possible disconnection when the vaporizer is moved.

⚠WARNING: When routing the mains cord to the electrical supply, ensure that it does not interfere with the correct functioning of other equipment.

3.1 Invert the vaporizer, unscrew the battery cover and remove the battery from the base of the vaporizer as illustrated in Figure 3.

3.2 Attach the battery terminals firmly onto the new battery, observing the correct polarity. Insert the battery into the vaporizer and tighten the cover screw.

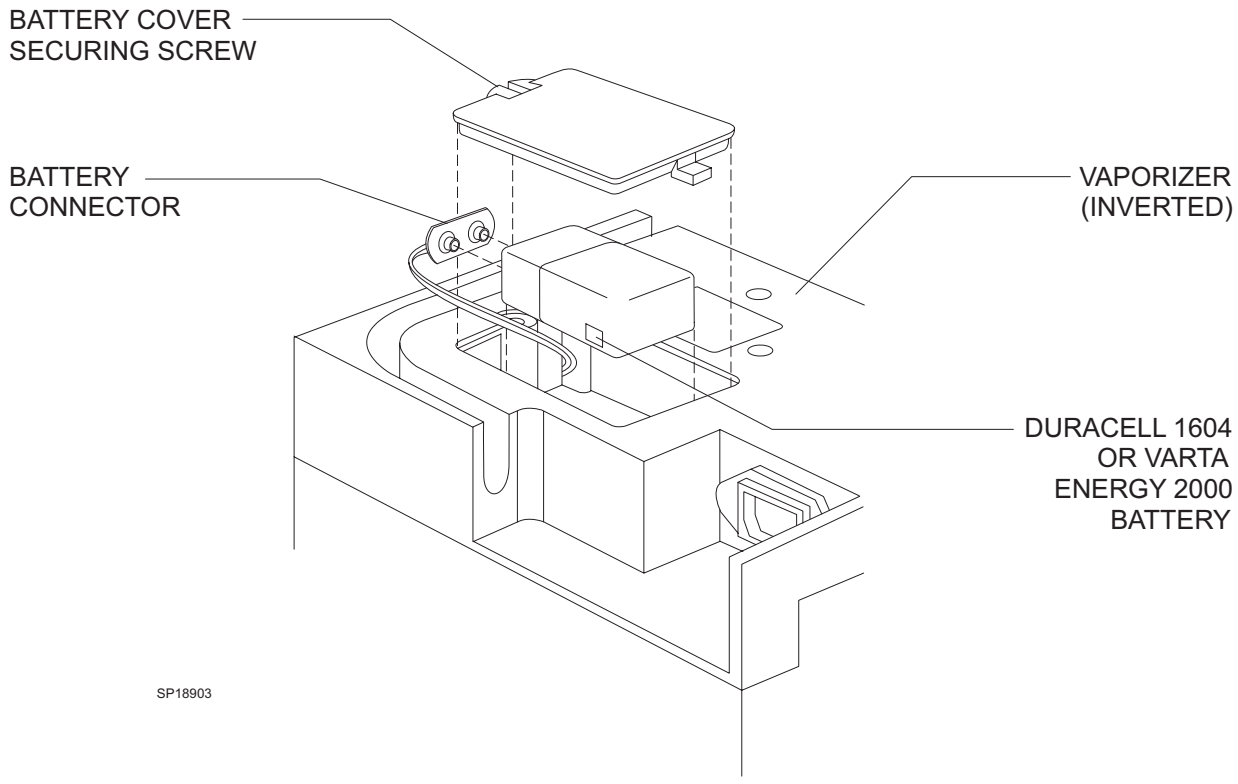

FIGURE 3. Vaporizer Battery Installation

Installation Procedure (continued)

3.3 Remove the mains lead retaining plate illustrated in Figure 4. Fit the power cord to the channel, and then reinstall the power cord retaining plate.

3.4 Feed the mains lead around the back of the vaporizer.

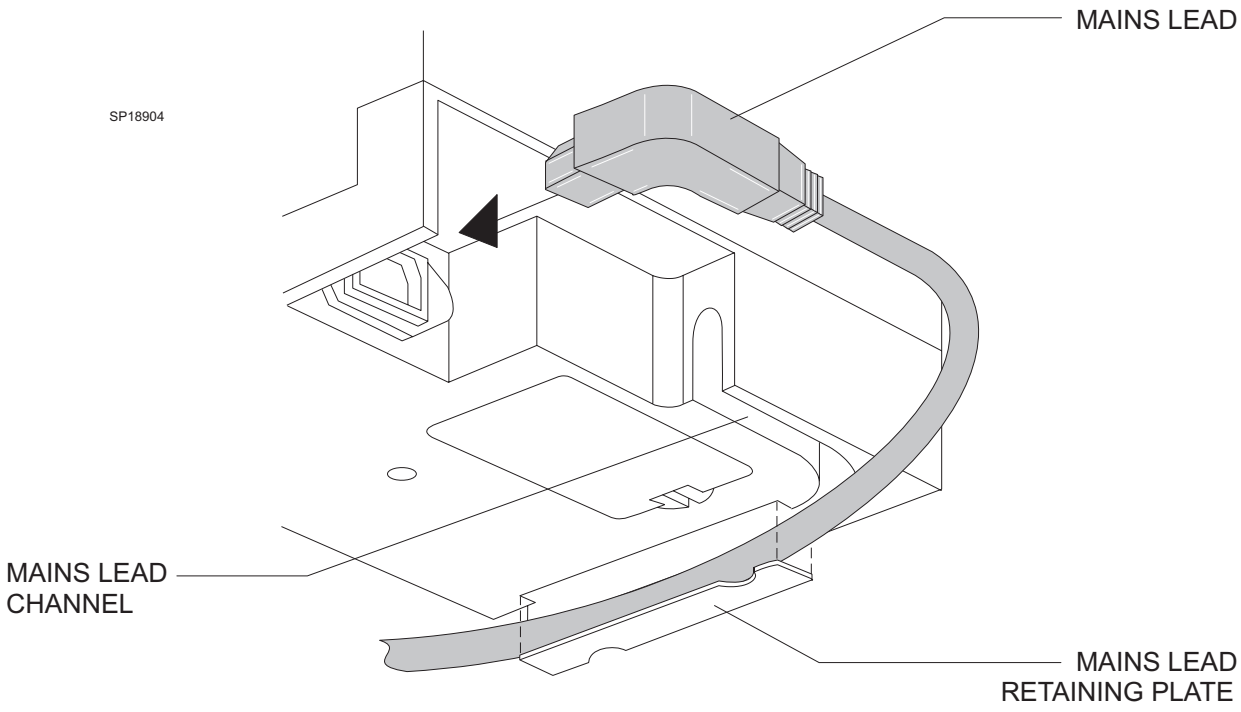

FIGURE 4. Fitting the Mains Lead

Installation Procedure (continued)

4.0 Vaporizer Installation and Initial Checks:

⚠Caution: Use only the Dräger plug-in mounting system.

⚠WARNING: Do not install a D-Tec vaporizer in the right hand position of a Narkomed 6000 as this will result in an incorrect fit and may cause leaks in the fresh gas delivery system.

4.1 Remove the protective plugs from the vaporizer's ports.

4.2 Verify that the locking lever is set to the "unlocked" position. See Figure 5. With both hands, hold the main body of the vaporizer in an upright position and lower it onto the mount, ensuring that the vaporizer ports correctly engage the port valves.

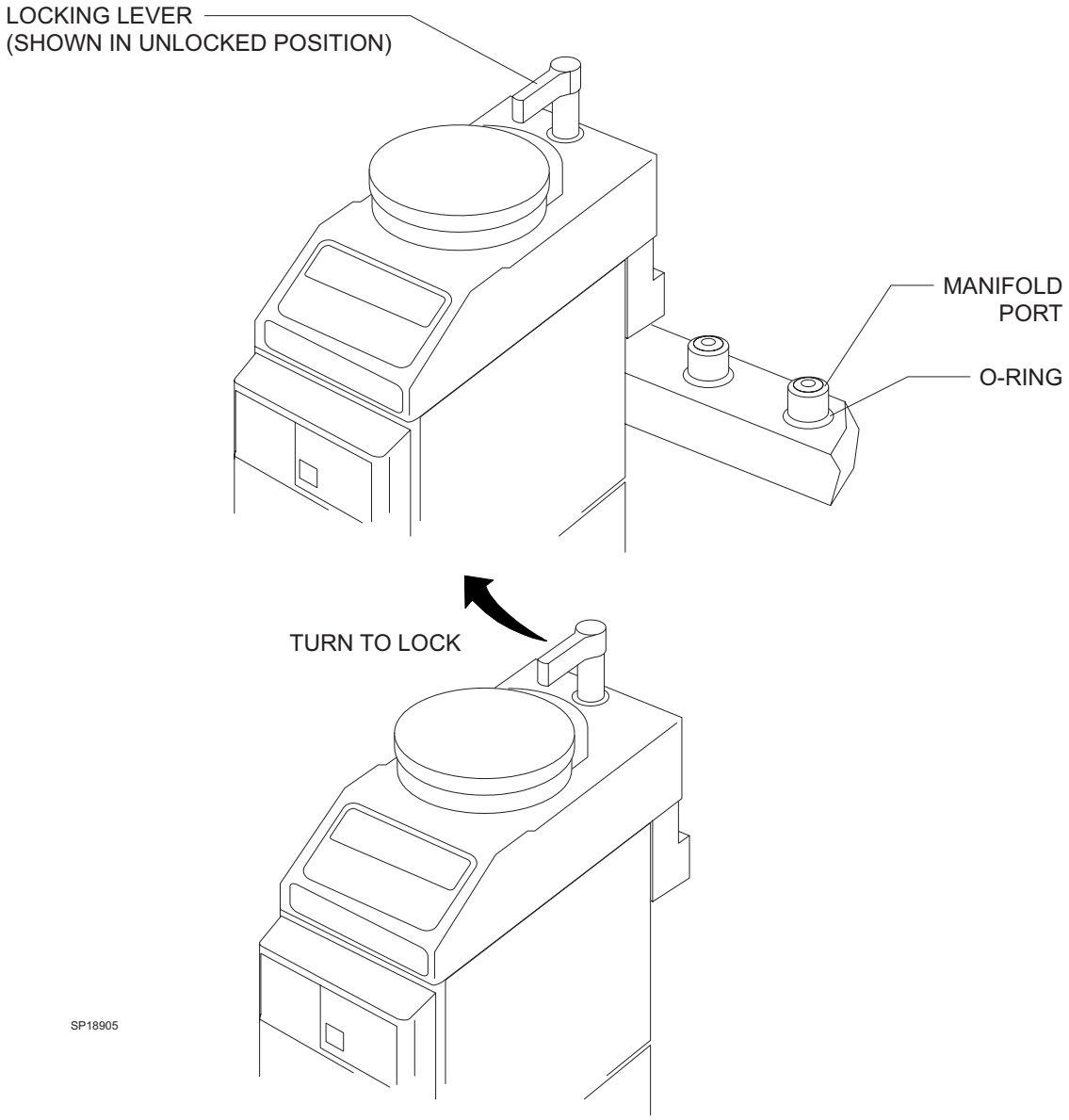

FIGURE 5. Vaporizer Installation

Installation Procedure (continued)

⚠Caution: The vaporizer must be completely seated horizontally onto the system manifold ports and should not require excessive force to attach.

4.3 Lock the vaporizer onto the manifold by turning its locking lever 90° clockwise. See Figure 5.

4.4 Verify that the vaporizer cannot be lifted off the manifold and is fully seated on the block.

4.5 Connect the power cord from the vaporizer to an approved hospital grade outlet.

⚠Caution: Do Not use the convenience receptacle on the Dräger machine.

4.6 Press the D-Tec Audio Mute key for at least four seconds and verify that the alarm and display test is automatically operated for a period of approximately two seconds as follows:

- Each light and all the LCD agent level indicator bars on the front display panel flash four times.
- The audio alarm is activated four times.

4.7 At the end of the test sequence, verify that the amber LOW AGENT lamp is illuminated.

4.8 Verify that the ALARM BATTERY LOW indicator is Not illuminated.

5.0 Filling the Vaporizer:

⚠WARNING: Do Not fill the vaporizer with any substance other than Suprane™ (desflurane). If any substance other than Suprane™ (desflurane) is used, patient injury could occur.

⚠WARNING: Do Not fill the vaporizer during testing.

⚠WARNING: The vaporizer must only be filled when it is in an upright position. Failure to observe this precaution may result in the vaporizer being overfilled.

⚠WARNING: The vaporizer must only be filled when it is connected to an electrical supply. This enables observation of the agent level on the display. Do Not attempt to fill the vaporizer when the level display indicates that it is full.

5.1 Remove the Suprane™ (desflurane) bottle cap and ensure that the O-ring is correctly fitted to the bottle probe.

5.2 Insert the bottle probe into the filler port on the vaporizer, and push the bottle firmly against the spring pressure until it is fully engaged with the filler port.

Installation Procedure (continued)

⚠WARNING: Ensure that the bottle is fully engaged into the filler port before attempting to lift the bottle. If the bottle can not easily be lifted, do not force it - otherwise the valve may be broken.

5.3 When the probe cannot be inserted any further into the filler port, attempt to lift the bottle upwards.

5.4 If the bottle cannot easily be lifted, it may be because the bottle has not been completely inserted. Therefore, firmly push the bottle straight into the filler port to its full extent to make sure that it is fully inserted.

5.5 When the bottle moves easily, lift it upward to lock the bottle onto the filler port as illustrated in Figure 6.

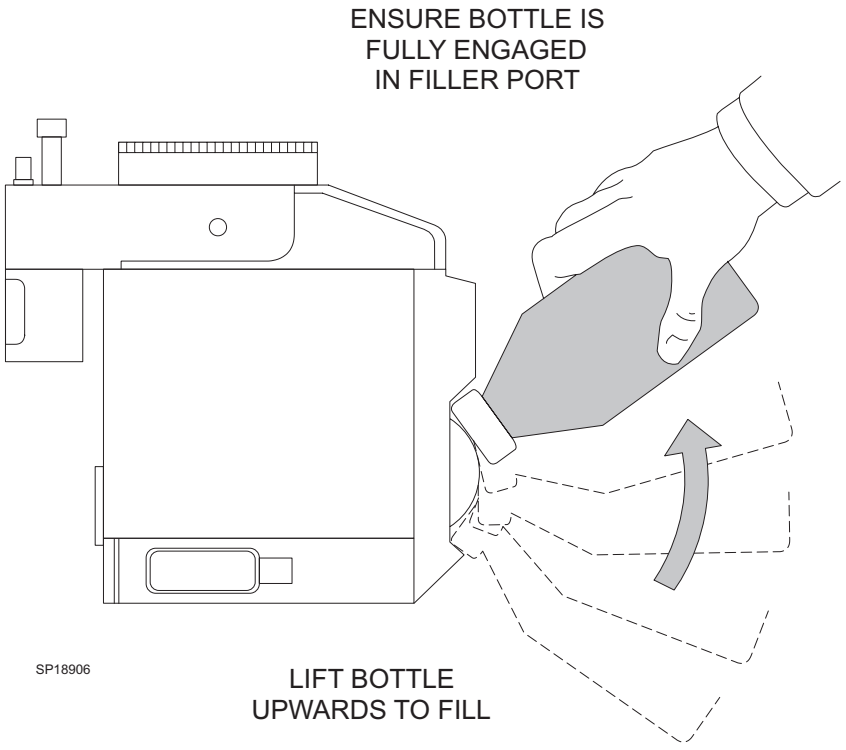

FIGURE 6. Starting Vaporizer Fill

5.6 When the bottle reaches the upper stop, bubbling of agent will occur for a period of up to 45 seconds before the agent flows from the bottle through the filler port and into the vaporizer.

5.7 Hold the bottle in position at the upper stop and continue filling until the bottle is empty or the indicator on the front panel shows that the sump is full.

Installation Procedure (continued)

⚠WARNING: Grip the bottle firmly while rotating it downwards from the upper stop to the lower stop position, and hold the bottle firmly in the filler port until the small amount of agent in the filler has drained back into the bottle. Failure to do so may result in spilled agent.

5.8 Grip the bottle firmly and lower it from the upper stop position to the lower stop position as shown in Figure 7.

5.9 When the bottle reaches the lower stop position, hold the bottle firmly in the filler port for a minimum of 5 seconds to allow the small amount of agent in the filler system to drain back into the bottle.

5.10 To avoid dropping the bottle, support the bottle as it is automatically unlocked from the filler port and released from the filler.

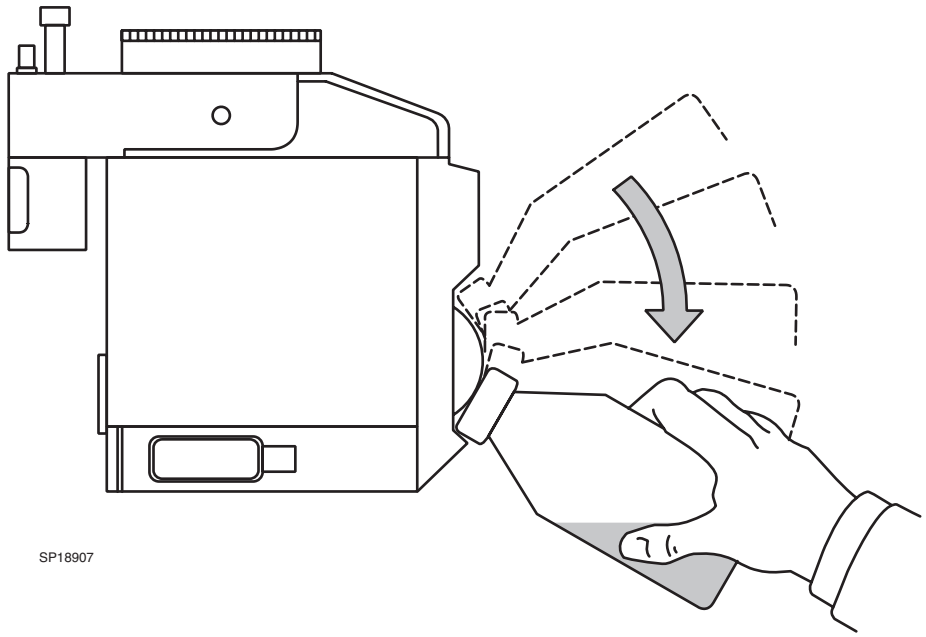

FIGURE 7. Stopping the Fill

Installation Procedure (continued)

6.0 Testing Procedure:

6.1 After a warm-up period of up to 10 minutes, verify that the amber WARM-UP light extinguishes and the green OPERATIONAL light illuminates, indicating the vaporizer is ready for use.

6.2 Turn off all vaporizers and perform a low-pressure fresh gas leak test as described in the relevant anesthesia machine's operator's or service manual.

6.3 Turn the D-Tec vaporizer to the 1% setting by fully depressing the release bar at the rear of the dial, and then turning the dial. Repeat the fresh gas leak test.

6.4 Disconnect the vaporizer AC power cord. Wait for at least 15 seconds and verify that the red NO OUTPUT light and audio alarm are activated.

⚠Caution: Do Not use the convenience receptacle on the Dräger machine.

7.0 Electrical Safety Testing:

7.1 Protective Ground Continuity

Note: Do not plug the safety analyzer into a line isolation monitor as inaccurate readings may occur. To prevent an alternate path to ground, the anesthesia's AC power cord must be temporarily disconnected.

7.1.1 Plug the D-Tec vaporizer power cord into the safety analyzer, and plug the power cord of the safety analyzer into a 120 VAC receptacle.

7.1.2 Turn on the safety analyzer and set the function switch to the GROUND WIRE RESISTANCE position. Attach the test lead to the SINGLE LEAD connector.

7.1.3 Set the safety analyzer GROUND switch to the NORMAL position. Set the POLARITY switch to the OFF position.

7.1.4 The safety analyzer shall indicate 0.1 Ω or less when the test lead is applied to the cylinder yoke.

7.2 Chassis Leakage Current

7.2.1 Set the safety analyzer to the CHASSIS LEAKAGE CURRENT position.

7.2.2 Record the total leakage current with the polarity and ground switches set to the following positions:

Ground	Polarity
Open	Normal
Normal	Normal
Open	Reversed
Normal	Reversed

Verify that the leakage current is 250 microamps or less in each of the switch positions.

7.2.3 Connect the anesthesia machine's AC power cord to a hospital grade outlet.

7.2.4 Reconnect the vaporizer AC power cord to a hospital grade outlet.

Installation Procedure (continued)

8.0 Concentration Verification:

8.1 While depressing the opposite vaporizer's "0" release button, verify that its handwheel can not be turned.

8.2 Move the exclusion lever to the opposite position. Verify that the slider bar disengages the original vaporizer and engages the D-Tec without binding. Verify that the D-Tec vaporizer can not be turned on. Press the opposite vaporizer's "0" release button and verify that its handwheel can be turned. Return all vaporizers to "0".

8.3 Verify that the Riken Gas Indicator Model 18D bears a current calibration sticker.

8.4 Zero the Riken as per its operator's manual.

8.5 Activate the waste gas scavenger.

8.6 Configure the anesthesia machine's gas delivery system to test the installed vaporizers output concentration. Refer to the device service manual for specific instructions.

8.7 Set the oxygen flow rate to 5.0 L/min. and verify all other gases are at "0".

8.8 Verify that the Riken indicates 0.0% vol. and re-zero if needed.

8.9 Move the exclusion lever to allow activation of the D-Tec vaporizer.

8.10 Press the dial release bar and rotate the dial to the 4% setting.

8.11 Draw a gas sample into the Riken and read the gas volume % per the operator's manual. Record the reading on the desflurane vaporizer concentration verification form.

8.12 Verify that the value obtained is within the sum tolerances of the Riken and the vaporizer. (Refer to the desflurane vaporizer concentration verification form for High and Low limits.) Place a check mark in the appropriate Pass/Fail box on the form.

Note: The D-Tec vaporizer is calibrated by the manufacturer at an ambient pressure of 760 mm Hg (sea level). The partial pressure of the delivered agent at any selected dial setting varies directly with changes in ambient air pressure. Refer to the operator's instruction manual for required dial settings at higher altitudes.

8.13 Repeat the previous steps at desflurane vaporizer dial settings of 6%, 10%, 12% and 16%.

Note: The dial release must be depressed again to obtain the 16% setting.

8.14 Turn the vaporizer to the "0" position.

8.15 Press the O2 Flush to purge the system of residual agent. Close the O2 flow control valve and return all controls to their original settings.

DESFLURANE VAPORIZER CONCENTRATION VERIFICATION

Customer _____ AHA # _____

Address _____ Dealer _____

City _____ State _____ Zip _____

PO # _____ Machine Serial # _____ Vaporizer Serial # _____

Machine Model _____

Dial Setting	Low Lim. Tolerance	High Lim. Tolerance	Pass	Fail
4%	3.28%	4.72%		
6%	4.92%	7.08%		
10%	8.20%	11.8%		
12%	9.84%	14.16%		
16%	13.12%	18.88%		

Comments_____

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Service Representative:	I.D. No.:	Date:

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